BREAKER, PAVING GASOLINE-DRIVEN SYNTRON MODELS

TE-59, TE 59A TE 59C, AND TE 59D

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DEPARTMENT OF THE ARMY • *MAY 1952*

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DESTRUCTION NOTICE

If necessary to abandon this equipment in the combat zone, it shall be destroyed beyond any possibility of use and recognition or duplication.

Proceed as follows:

1. Remove all housing and smash the engine cylinder, crankcase, and magneto with a sledge, axe, or other heavy object.

2. Make certain that such units as carburetors, magnetos, and filters are completely destroyed.

3. Destroy all circuit labels, name plates, instruction books, and other identifying marks.

4. Pile all combustible material around the smashed unit, saturate with oil or gasoline and burn it.

5. Time permitting, smashed and burned equipment shall be buried in the earth or the bed of a stream.

●

SAFETY NOTICE

The exhaust gases from this unit contain carbon monoxide, a tasteless, odorless, deadly poison. Do not operate this equipment in a confined space without proper provision for ventilation.

Avoid contact with the hot cylinder and exhaust pipe while operating.

Avoid spilling gasoline on a hot engine. Keep clear of all moving parts while operating the equipment.

Do not lift the hammer before closing the throttle.

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SYNTRON

REG. TRADE MARK

GASOLINE HAMMER

PAVING BREAKERS

2

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BREAKER, PAVING,

GASOLINE,

SYNTRON

REG. TRADE MARK

SECTION I DESCRIPTION

1. General.—

Tool Equipment TE-59-B and D is a gasoline-operated hammer. This Equipment is a single cylinder, 2-cycle, air-cooled gasoline engine which is operated in an inverted position. The engine is provided with a secondary piston which takes the place of the cylinder head used with conventional engines.

The exploding force of the fuel mixture is expanded between the primary or conventional piston and secondary piston or hammer. The exploding mixture causes the primary piston to function in the same manner as in a conventional 2-cycle gasoline engine, while the secondary piston, acting as a hammer, transmits a part of the force of the explosion to the shank of a tool fitted into a housing below the cylinder.

The secondary piston chamber is of larger diameter or bore than that of the primary piston. A part of the exhaust gas is admitted to the under side of the secondary piston chamber through a port which is opened and closed by the secondary piston in the same manner in which the primary piston opens and closes the intake and exhaust ports in the main or primary cylinder. The pressure of this exhaust gas lifts the secondary piston and returns it to the firing position. A by-pass valve is provided, operated by the throttle control, which when opened starts the secondary piston to operate.

The fuel mixture is provided by a conventional carburetor, and ignition by a fly-wheel type magneto and spark plug.

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2. Preparation for Use.—

Before filling the fuel tank, turn the starter wheel by hand to make sure that all parts move freely. Using a separate container, thoroughly mix one pint of SAE 70 motor oil with seven quarts of gasoline. When you are sure that the oil and gasoline are thoroughly mixed, fill the fuel tank with this mixture.

3. Tool Insertion.—

Insert the tool to be used in the housing or tool holder below the cylinder as far as it will go, and with the unit resting on the end of the tool raise it to an upright position. DO NOT ATTEMPT TO START THE UNIT WITHOUT A TOOL IN THE TOOL HOLDER. When inserting or removing tools from the tool holder, latch* (153) must be released and returned to its original position after the insertion or removal of the tool.

4. Starting.—

Open the fuel valve* (198) and close the choke (48) by pushing all the way down. With the unit held upright, wind the starting cord around the starter pulley in such a manner that it will rotate the engine in the direction of the arrow shown on the starter wheel. Hold the unit firmly with one hand placed underneath the control throttle and give the starter cord a quick steady pull with the other. If the unit does not start after the second or third attempt, open the choke and make another attempt to start the unit. Should the unit refuse to start after several attempts, check the following:

a. Make sure there is fuel in the fuel tank.

b. See that the fuel shut-off valve is open.

c. Close the main and idling jets on the carburetor and then readjust the main jet 1¼ turns open and the idling jet ¾ of a turn open.

d. Check, through the hole provided, to see that the spark plug wire is secured to spark plug.

e. Remove the spark plug and see if it is wet or otherwise fouled, and that the gap is set at .025.

f. Disconnect the fuel line from the carburetor to be sure that there are no obstructions and that fuel flows freely.

*Refer to cut on pages 14 and 15.

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g. Other possible difficulties will be found under Section III, Maintenance. After having checked all possible causes for failure to start and corrected any faults found, the unit should start.

5. Regulation.—

When the unit has started, open the choke (48) slowly and after thoroughly warmed up, adjust the idling jet (51 next to cylinder) if necessary. This adjustment should be on the rich side to prevent the engine from stopping when the hammer is moved from place to place when actual work is being done.

After this is accomplished, depress the control lever fully. This puts the hammer in operation. Then adjust the power jet (51 farthest from cylinder) to the best power that can be obtained.

Now place the tool on the work to be done and squeeze the control throttle (115) all the way down and release it as soon as the cut or operation is completed. When the throttle is released, the unit will idle and the by-pass will be closed, retarding the operation of the secondary piston. The unit may now be moved to a new position and the work continued.

The unit may be stopped by pressing the stop-button (178) and holding it in until the engine has stopped turning.

6. Pointers on Breaking Concrete.—

When starting a concrete breaking operation, always work from the edge of the slab or first make a hole around which chunks can be broken out. Place the point of the tool from 4" to 6" back from the edge and break off small chunks rather than attempt to break out a 2 foot or 3 foot chunk. If the point of the tool buries itself without fracturing off a section of concrete, move the tool over to a new position a few inches away.

IMPORTANT—Always close gas tank pet cock when hammer is stopped, especially if laid down.

SECTION III MAINTENANCE

7. Daily Service.—

a. Keep the by-pass ports and valve clean with the tool supplied for this purpose.

The high pressure section and the low pressure section are connected by ports A, B, and C (refer to cross-section drawing page 15). These ports or passages must be cleaned of accumulated carbon daily, which is accomplished as follows:

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Remove the by-pass valve assembly from the side of the cylinder. Take out round head screw (140) just above it. Be sure hammer piston is clear of ports A and C before attempting to insert the cleaning tool.

The best position for the hammer for this cleaning is standing upright resting on the tool. This shoves the hammer piston up, clearing ports A and C.

Using the cleaning tool as a drill by rotating, remove the carbon from port B until the tool strikes bottom, which indicates that it has entered port A. Now clean port A similarly until the tool freely enters the cylinder. Clean lower port C in the same manner.

Be careful not to shove the tool in ports A and C so far that it will score the opposite side of the cylinder.

Replace screw (140) in port A and reattach the by-pass valve (146), making sure that the gasket (147) is properly placed and the valve assembly tightly bolted to the cylinder.

b. Now clean all accumulated carbon from the flat portion of the exhaust pipe discharge opening. This should be done daily.

CAUTION: These by-pass ports and the exhaust pipe opening must be kept free of accumulated carbon; otherwise, the power of the hammer's blow will fall off. Never attempt to increase or decrease this opening at the end of the exhaust pipe.

c. The air cleaner screen (82) should be thoroughly cleaned by washing in gasoline and then dipping in lubrication oil. Do this daily when the hammer is being used continuously and more often when working in very dusty locations.

Remove screw (86) and outside plate (83) to take out screen. Wash in gasoline, dip in lubricating oil, and allow to drain before replacing in air cleaner.

8. Carburetor.—

Always try to have the hammer warmed up before attempting to make carburetor adjustments. The approximate opening of the main jet (51 farthest from cylinder) is 1¼ turns from the closed position.

CAUTION: If, for any reason, the carburetor bowl (75) is removed from the carburetor, be sure to replace it with the inlet, to which the fuel tube is attached, at right angles to the center line of the carburetor.

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The bowl must be located this way so that the hammer will operate in various positions from the horizontal without changing the fuel level in the float chamber. This level should be about ¾" from the top of the bowl.

9. By-Pass Valve.—

If the by-pass valve has been disassembled, it probably will be necessary to adjust the position of the by-pass control rod (180) on the by-pass valve plunger rod sleeve (137).

This by-pass valve must be set with the control lever (115) compressed all the way down and then locked to the correct position by adjusting the ¼" nuts on rod (160) so that it is at the extreme top of its travel upwards. Spring (159) should be off when making this setting.

After making this adjustment, it may be necessary to adjust the idling of the engine again. This is accomplished by loosening screw (202) and, with a screw driver, adjust the butterfly stem (68) in the carburetor to the desired position.

Do not allow the engine to idle too slowly as it may stop frequently while working.

10. Ignition.—

Ignition is by means of a flywheel magneto.

The ignition setting or timing is indicated by means of a mark on the Magneto Stator Plate, and a corresponding mark on the Crankcase head. When the two marks are in alignment, the ignition is correctly timed.

If you fail to get a spark in the hammer, first check to see if you are getting a spark to the spark plug by holding the spark plug wire ⅛" away from the body of the hammer, while cranking.

If the spark is obtained in this manner, examine the spark plug for too wide or too narrow setting of the points or fouling. Plugs should be set at .025".

If you get no spark by this test, examine the magneto points. To accomplish this, first remove hood (97) back off the crankshaft nut beyond the end of the shaft, and if the flywheel will not come off by pulling strike this nut a sharp tap with a hammer to jar the flywheel loose (be sure the nut is backed off beyond the end of the shaft). Check the magneto breaker points to see that they are free of oil, are not pitted and burned, and are set to .020". Also check for a broken wire or a grounded wire, or a loose terminal on the wire. If this does not correct the trouble, it indicates that either the magneto coil or the condenser is at fault.

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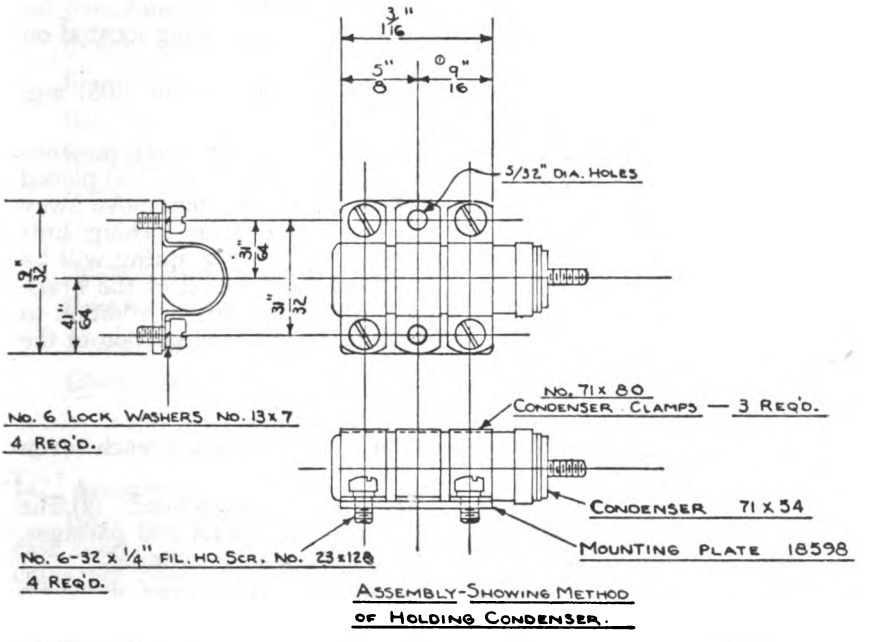
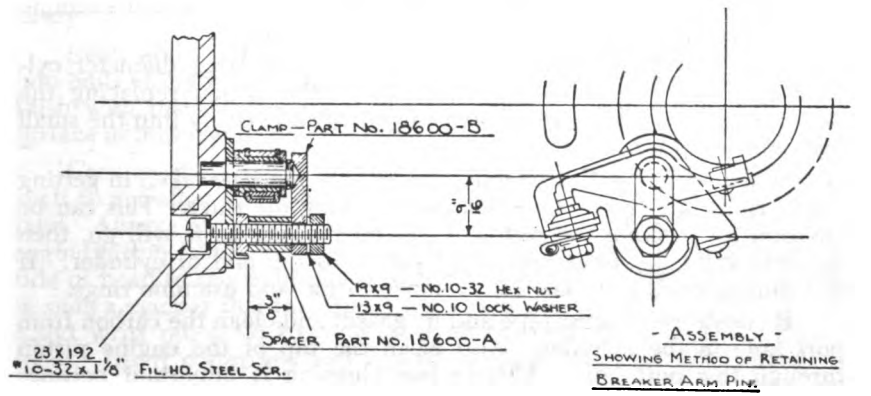


ASSEMBLY-SHOWING METHOD OF HOLDING CONDENSER.



- ASSEMBLY - SHOWING METHOD OF RETAINING BREAKER ARM PIN.

CAUTION: The spark plug is a special plug designed and built for gas-hammer service. Ordinary spark plugs will not stand this hammer blow service. Always have several spare spark plugs available.

11. Governor.—

After a long period of operation the brake shoes on the flywheel may need adjusting, which will be evidenced by too high an operating speed. This condition results from wear on the brake shoes and wear on the brake band.

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To adjust the brake shoes, first remove housing (97) and then remove the flywheel or rotor (26), the adjusting means being located on the inside of the rotor. (See IGNITION.)

Replace worn shoes, if necessary; loosen locking nut (168) and back out hex socket-head screw (169).

Adjust both screws the same amount to keep the brake pressure even. This pressure should be set by a 23 lb. weight (± 2 lbs.) placed on the heel of the brake shoe to make the tip of the shoe move away from the flywheel surface. Be sure to tighten the locking nuts securely. The approximate tension on the brake shoe spring will be obtained by resting the weight of the rotor on the heel of the brake shoe just over the spring. A weight of 4 or 5 pounds in addition to the weight of the rotor should cause the tip of the long portion of the brake shoe to move out of contact with the rotor rim.

12. Cleaning Carbon.—

Carbon should be cleaned from the hammer once in each seven days of operation.

Check the following points: (1) The hammer-piston head. (2) The exhaust port and engine piston. (3) The by-pass ports and passages. (4) The bevel around the bottom of the small diameter cylinder.

Remove the tool holder by taking off the bottom nuts of the tie rod, take the tool bushing out, and the lower hammer striking piston may be removed. Clean carbon from this piston head and examine the piston rings to see that none of them are broken.

Clean the carbon off the bevel between the large diameter cylinder and the small diameter cylinder so that when replacing the hammer striking piston, the piston rings will slide easily into the small diameter cylinder.

When replacing this hammer piston care must be taken in getting piston rings into the 3″ bore without breaking the rings. This can be checked by pushing the piston in cylinder as far as it will go, then measure from the large section of piston to the end of cylinder. If this dimension is less than 2⅜″, remove piston and examine rings.

Remove the exhaust pipe and its gasket and clean the carbon from port hole in the cylinder. Also clean the top of the engine piston through this port hole. This carbon cleaning is important because built-up carbon on the top of the engine piston and around the exhaust port will interfere with the hammer's power within a period of time.

Refer to Daily Service (page 7) for instructions for cleaning by-pass ports.

13. To Dismantle.—

Remove nose casting (150) and hammer piston guide (149) and hammer piston (148).

Remove fan housing (97).

Remove flywheel and magneto assembly, and key (101) Washer (98) and breaker cam (25).

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Remove gas tank and carburetor housing (205).

Remove the four tie rods (209 and 210).

Remove carburetor and by-pass rods (180 and 183).

Remove handle (182).

Remove connecting rod and piston (135) from crankshaft.

Remove starter pulley (126) and housing (127).

Remove crank case head (112) and pull out crankshaft (102).

Remove bearings (104) and oil seals (103).

Remove carburetor exhaust pipe and spark plug.

Remove by-pass valve assembly.

Disconnect cylinder from crankcase.

Remove connecting rod (130) from piston by pulling key (134) and tap out wrist pin (133).

14. Assembly.—

Insert crankshaft bearings (104) into crankcase (116) and crankcase head (112). Use 1/64" thick gasket (108) between crankcase and crankcase head. Insert threaded end of crankshaft (102) into crankcase head (112), and then insert opposite end of crankshaft into crankcase (116) and bolt tightly together. Turn crankshaft to see if it rotates freely.

Next, apply oil seals (103) on both ends of crankshaft, and tap into ends of crankcase and crankcase head until the outside surface is flush with machined surface of each casting. The flat or stenciled surface of these seals should be to the outside.

Care must be taken when placing these seals on end of crankshaft to not allow the leather to crimp or fold back and defeat its purpose. Always use new oil seals—never install a used seal. Then place engine piston (135) on bench, keeping the head down and the tapered side of head to the right, and insert connecting rod (130) in the piston in such a manner that the dipper (on bearing cap) is next to you. Now insert wrist pin (133) keeping in mind the cotter key hole for alignment. Insert cotter key and spread inside of wrist pin for locking.

Continue to keep this piston and connecting rod assembly with the tapered side on the head of the piston to the right, insert bearing end of connecting rod into crankcase side having the almost round hole, with the threaded end of crankshaft to the left, and assemble connecting rod to crankshaft. This keeps the ports in their correct position to the piston.

CAUTION: Always put some oil on connecting rod bearing before assembling. Then pull up tight and place cotter key in castellated nut. Do NOT under any condition have this connecting rod bearing too tight. The correct fit is as follows: Remove shims from bearing until bearing just begins to get tight on shaft or until absolutely no play

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is felt but not binding in any way. Then place a .006 shim on each side of bearing. If this procedure is not followed, the bearing may become hot and cause engine to stop.

Now place rings on engine piston and oil freely. Always use rings supplied as they are a lock-type ring. Any other rings may cause trouble as they pass over ports.

After placing gasket (129) on crankcase, the cast iron cylinder (94) is ready to be placed.

Assemble in such a manner as to have the spark plug (95) directly underneath the flywheel or threaded end of shaft. Pull nuts up evenly and check to see if crankshaft is free to rotate.

Place brake lining (111) in place provided in crankcase cover (112) and rivet same in place. This lining is ⅛" thick, 1" wide and 26½" long.

CAUTION: Never use a metallic lining as the dust from the lining will short breaker points.

Place spark plug lead wire through hole provided, and ground wire to stop-button screw.

Now assemble stator plate (2) on casting (112) and breaker cam (25) on crankshaft, and rotate stator plate to such a position that the fixed contact (18) and movable contact (23) just break apart as the crankshaft is at 42° advance to dead center. (Facing the flywheel, it turns counter clockwise). Lock stator plate in this position and check breaker points to see that the gap is set at .020. Adjust by loosening clamp nut (19) and rotate breaker assembly. Place magneto spring washer (98), Woodruff key (101) and flywheel on crankshaft, and tighten. Next, place two long tie rods (209) in holes on top of crankcase and also through gasket (123) and handle assembly in such a position that the long tie rods are located one to the right and one to the left of carburetor port—the other two tie rods (210) in remaining holes —and bolt down tight and even. Bolt carburetor to cylinder casting, with Parker-Kalon ⅜" x 1" standard bolts—using enough #204 carburetor gaskets to make up a $\frac{3}{16}$" thick gasket. Bolt exhaust pipe on studs provided, using gasket (128). Put brass bolt (140) in by-pass clean-out hole. Bolt on by-pass assembly (146) on lower end of cylinder on studs provided, using gasket (147). Connect by-pass control rod and carburetor control rod to handle assembly.

Place starter cover (127) on end of shaft and bolt to crankcase. Also put on grooved starter wheel (126) and pin (124).

Put spacers (190) on long tie rods and mount gasoline tank (192) and cover (191), and bolt fast to tie rods at top and gas tank bracket (193) on bottom. Connect gasoline line (201). Bolt carburetor cover (205) in place, insert sparkplug, attach wire and then assemble flywheel guard (97).

Place rings on hammer piston, having a clearance of .016 in gap on 3" diameter and 3⅝" diameter.

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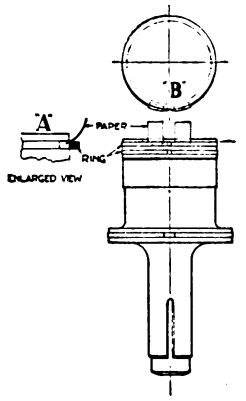

INSTRUCTIONS
for
INSTALLING
HAMMER PISTON

With the rings in place on the piston, insert a strip of paper about ½" wide and of sufficient thickness along one side of the piston ring near the gap as at "A". Now push the ring into the groove. The paper will be carried along into the groove and will wedge the ring tightly in place. Fold paper, if necessary, to secure proper thickness.

Bring the free end of the ring as close as possible to the end just wedged in place, and by similarly inserting a piece of paper under this end of the ring, push it into the groove.

The ring should now remain tightly in the groove in approximately its working position, as shown at "B".

Tear off any surplus length of paper flush with the piston ring before attempting to insert piston into the cylinder.

When piston enters cylinder, tap lightly on end, if necessary, to force it into position.

The above procedure is necessary for the two small or 3" diameter rings, and is not required on the large diameter ring, since the latter may be compressed with the fingers as the piston enters the cylinder bore.

The pieces of paper used to hold the rings in place will disintegrate as soon as the hammer is put in operation.

Place well oiled piston in cylinder. Put piston guide (149) on stem of piston and place on nose casting (150) and bolt tight and even.

Insert tool in nose casting and put gasoline, with proper mixture of fuel (one part oil to fourteen (14) parts gasoline) in tank. Open needle valve ¾ of a turn (next to cylinder) and power needle valve about 1¼ turns. Push choke lever (48) all the way down on carburetor, wrap rope around starter pulley so as to rotate in direction indicated by arrow on starter wheel (126), and without depressing control lever (115) but by placing one hand underneath this lever, give a sharp pull on starter rope. Repeat this for two or three pulls, then raise choke lever one notch and repeat starting action. Engine should then run in idle position.

Allow engine to warm up and raise choke lever (48) to top position, as permitted.

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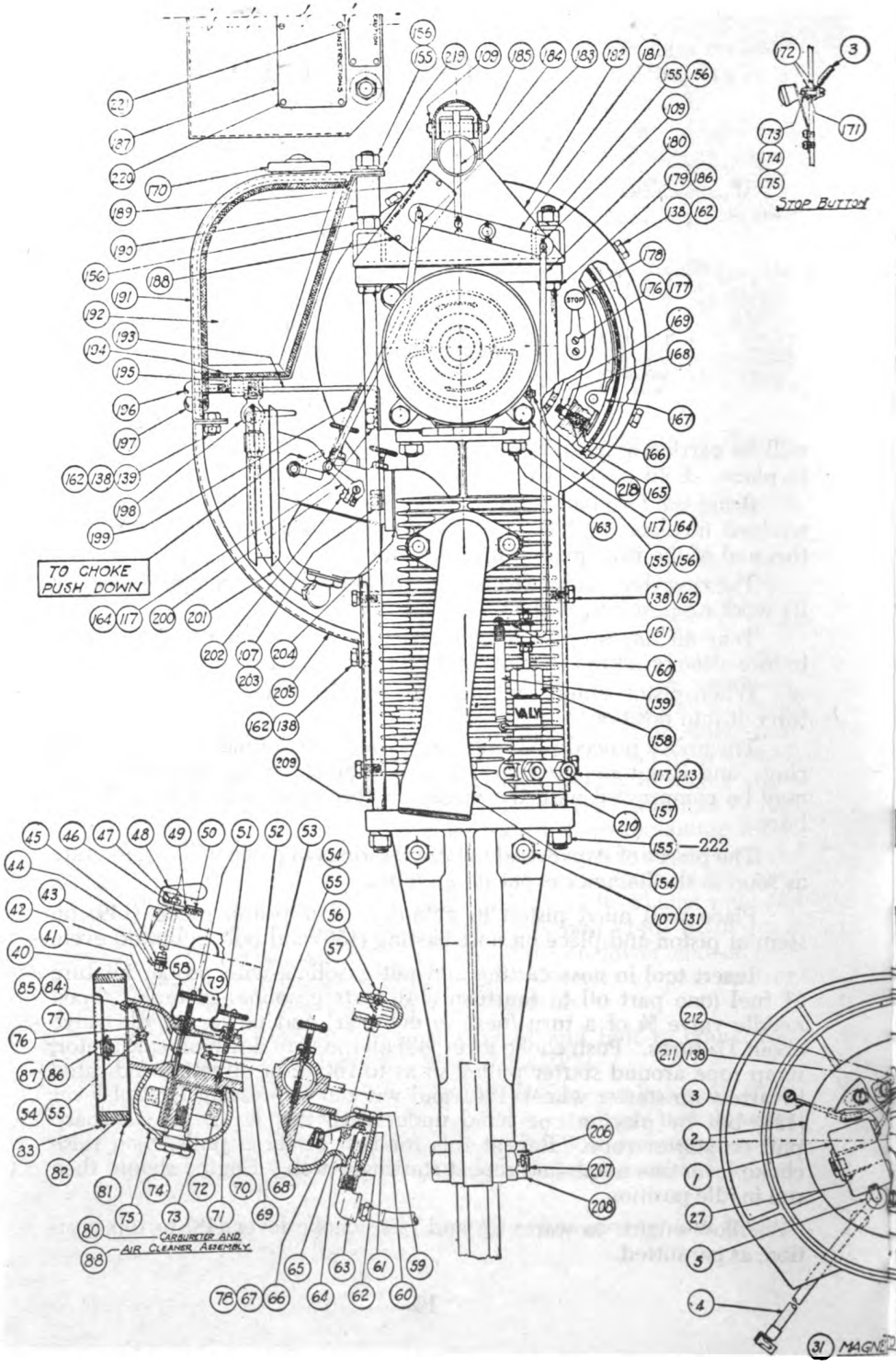

14 **Cross Section of Gasoline Hammer with**

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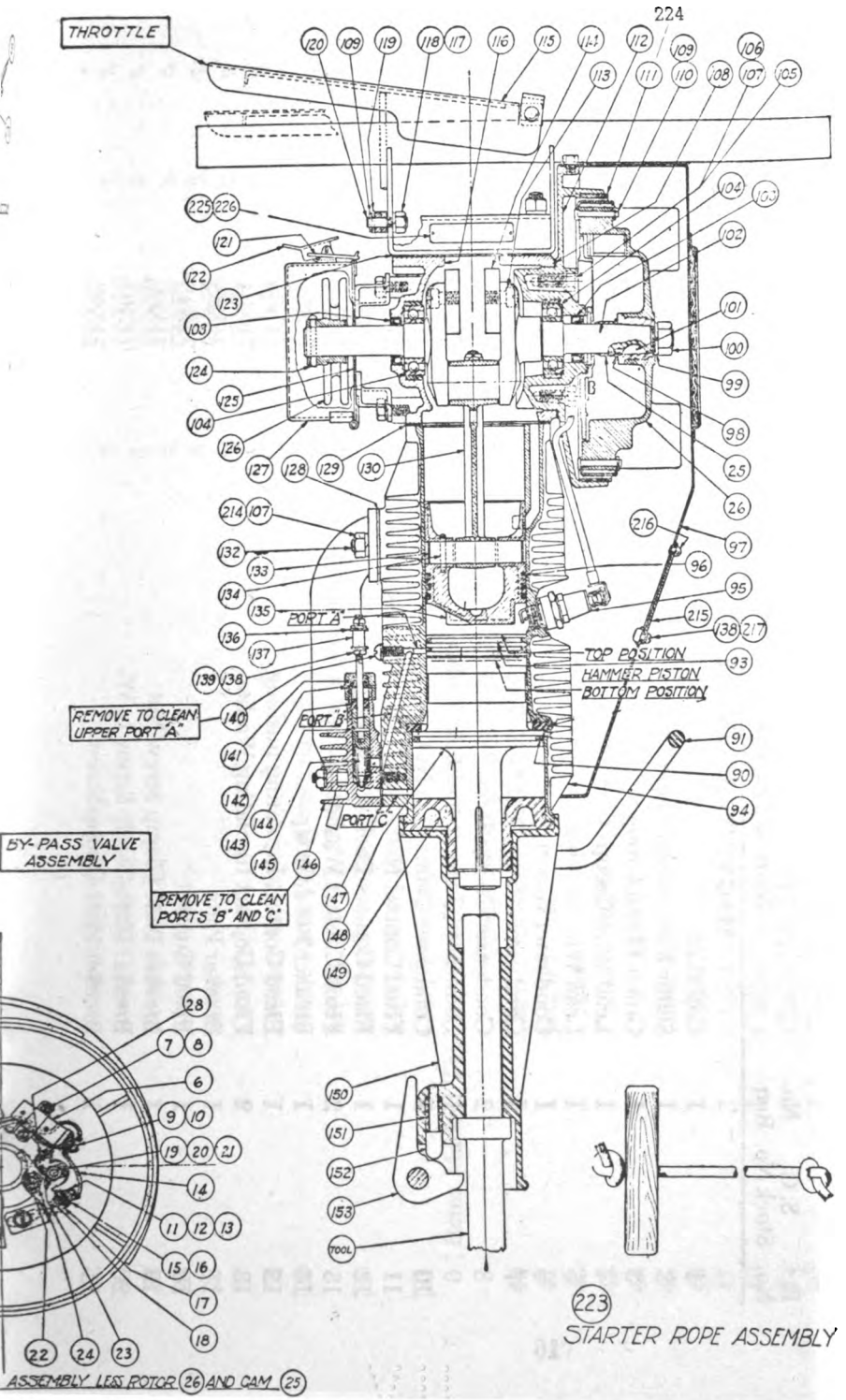

parts keyed to following Parts List

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TABLE OF REPLACEABLE PARTS

*Reference numbers are given only when referred to in text or illustrations.
**Function is given only when name and description do not suffice.

*Ref. No.	S. C. Stock No.	No. Req.	Name & Description	**Function	Mfgr's Part No.	Mfr.
			MAGNETO ASSEMBLY			
1		1	Coil Unit	Ignition	71X49	SYNTRON CO.
2		1	Stator Plate Replacement Group	"	71X50	" "
3		1	Ground Lead Group	"	71X51	" "
4		1	Lead Wire Group	"	71X52	" "
5		1	Lead Wire Bushing	"	71X53	" "
6		1	Condenser Group	"	71X54	" "
7		2	Condenser Clamp SCR Lock Washer	"	71X55	" "
8		2	Condenser Clamp Screw	"	71X56	" "
9		1	Condenser Connection Lock Washer	"	71X57	" "
10		1	Condenser Connection Nut	"	71X58	" "
11		1	Fixed Contact Nut	"	71X59	" "
12		1	Fixed Contact Lock Washer	"	71X60	" "
13		2	Fixed Contact Washer	"	71X61	" "
14		1	Breaker Lead Group	"	71X62	" "
15		1	Fixed Contact Insulating Bushing	"	71X63	" "
16		2	Fixed Contact Insulating Washer	"	71X64	" "
17		1	Breaker Plate	"	71X65	" "
18		1	Fixed Contact	"	71X15	" "
19		1	Breaker Plate Clamp Screw Nut	"	71X66	" "
20		1	Breaker Plate Clamp Screw L. W.	"	71X67	" "
21		1	Breaker Plate Clamp Screw	"	71X68	" "

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22	2	Breaker Arm Washer	"	71X69	"	"
23	1	Breaker Arm Group	"	71X16	"	"
24	1	Breaker Arm Lock	"	71X70	"	"
25	1	Breaker Cam	"	71X71	"	"
26	1	Rotor	"	71X72	"	"
27	4	Coil Wedge	"	71X73	"	"
28	1	Breaker Arm Spring	"	71X74	"	"
†29	1	Stator Plate Unit (Contains 1, 2, 8 14, 23, 5, 6, 27, 22, 28, 24, 19, 9, 20, 10, 7)	"	71X75	"	"
†30	1	Breaker Plate Group(Contains 17, 14, 13, 15, 12, 11, 18, 16)	"	71X76	"	"
†31	1	Complete Magneto	"	18222	"	"

† Items Marked Thus Are Not Shown Separately.

CARBURETOR ASSEMBLY

40	1	Carburetor Body Casting	Carburation	18235	"	"
41	1	Jet, Working	"	18277-B	"	"
42	1	Venturi	"	18236	"	"
43	1	Choke Valve Shaft Cotter Pin	"	10X2	"	"
44	1	Choke Valve Shaft Washer	"	18X71	"	"
45	1	Choke Valve Shaft Tension Spring	"	71X18	"	"
46	1	Choke Valve Lever Clamp L.W.	"	13X2	"	"
47	1	Choke Valve Lever Clamp Nut	"	19X8	"	"
48	1	Choke Valve Operating Lever	"	71X19	"	"
49	1	Choke Valve Lever Friction Ball	"	71X13	"	"
50	1	Choke Valve Lever Friction Spring	"	18287	"	"
51	2	Needle Valve	"	18582	"	"
52	2	Needle Valve Packing Gland	"	71X45	"	"
53	1	Throttle Valve Disc	"	71X22	"	"
54	4	Valve Disc Clamp Screw	"	23X128	"	"
55	4	Valve Disc Clamp Screw L.W.	"	13X7	"	"

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Ref. No.	S. C. Stock No.	No. Req.	Name & Description	**Function	Mfgr's Part No.	Mfr.
56		2	Float Valve Lever Shaft Bearing	Carburation	71X26	SYNTRON CO.
57		1	Float Valve Lever Shaft	"	71X27	" "
58		1	Needle Valve Tension Spring (Main)	"	71X46	" "
59		1	Float Valve Chamber Cap	"	71X28	" "
60		1	Float Valve Chamber Cap Gasket	"	71X29	" "
61		1	Float Valve	"	71X30	" "
62		1	Float Valve Seat	"	71X31	" "
63		1	Street Elbow	"	71X17	" "
64		1	Float Valve Seat Gasket	"	71X32	" "
65		1	Float Valve Lever	"	71X33	" "
66		1	Float Supporting Screw	"	71X34	" "
67		1	Float Supporting Screw Nut	"	71X35	" "
68		1	Throttle Valve Shaft	"	71X23	" "
69		1	Jet, Idling	"	18277-A	" "
70		1	Bowl Gasket, Top	"	18280	" "
71		1	Gasoline Duct Plug	"	18348	" "
72		1	Float	"	71X47	" "
73		1	Bowl Gasket, Bottom	"	71X12	" "
74		1	Bowl Support Screw	"	18237	" "
75		1	Bowl	"	71X36	" "
76		1	Choke Valve Shaft	"	71X20	" "
77		1	Choke Valve Disc	"	71X21	" "
78		1	Float Support Screw Bushing	"	71X78	" "
79		1	Needle Valve Tension Spring (Idling)	"	18574	" "
80		1	Complete Carburetor	"	18231	" "

AIR CLEANER ASSEMBLY

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81	1	Inside Plate	Air Cleaning	71X37	"	"
82	1	Screen	" "	71X38	"	"
83	1	Outside Plate	" "	71X39	"	"
84	2	Air Cleaner Attaching Screw	" "	23X195	"	"
85	2	Air Cleaner Attaching Screw L.W.	" "	13X9	"	"
86	1	Outside Plate Clamp Screw	" "	28X218	"	"
87	1	Outside Plate Clamp Screw L.W.	" "	13X18	"	"
88	1	Complete Air Cleaner	" "	18301	"	"
		PARTS FOR HAMMER				
90	1	Hammer Piston Ring 3⅝" Dia.		18573	"	"
91	1	Lower Handle		18128	"	"
93	2	Hammer Piston Ring 3" Dia.		18572	"	"
94	1	Cylinder		18283	"	"
95	1	Spark Plug		17X632	"	"
96	3	Engine Piston Rings		18219	"	"
97	1	Cylinder and Fan Housing		18308	"	"
98	1	Magneto Spring Washer		18221	"	"
99	1	Magneto Clamp Nut L.W		13X43	"	"
100	1	Magneto Clamp Nut		25X6	"	"
101	1	Woodruff Key—For Flywheel		71X10	"	"
102	1	Crankshaft		18297	"	"
103	2	Crankshaft Bearing Oil Seal		71X9	"	"
104	2	Crankshaft Bearing		71X14	"	"
105	1	Crankcase Head Clamp Screw—Flat Head		28X157	"	"
106	3	Crankcase Head Clamp Screw—Hex Head		28X181	"	"
107	9	Lock Washers for ⅜" Bolt		13X33	"	"
108	1	Crankcase Head Gasket		18204	"	"
109	9	Cotter Pin $\frac{1}{16}$" x ¾"		10X5	"	"
110	2	Governor Brake Shoe Mounting Pin		18226	"	"
111	1	Governor Brake Lining		18238	"	"

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Ref. No.	S. C. Stock No.	No. Req.	Name & Description	**Function	Mfgr's Part No.	Mfr.
112		1	Crankcase Head		18234	SYNTRON CO.
113		4	Crankshaft Counterweight Screw		18282	" "
114		2	Crankshaft Counterweight		18213	" "
115		1	Throttle Control Lever		18241	" "
116		1	Crankcase		18232	" "
117		8	Lock Washer 5/16"		13X17	" "
118		1	Hex Nut 5/16"—18 U.S.S.		27X2	" "
119		1	Plain Washer 5/16"		18X8	" "
120		1	Control Rocker Arm Stud		18555	" "
121		1	Starter Guard Latch Lever Ring		14127-1	" "
122		1	Starter Guard Latch Lever		18209	" "
123		1	Handle Bracket Gasket		18203	" "
124		1	Starter Pulley Mounting Pin		18271	" "
125		1	Starter Pulley Cover Base		18328	" "
126		1	Starter Pulley		18205	" "
127		1	Starter Pulley Cover		18327	" "
128		1	Muffler Gasket		18239	" "
129		1	Cylinder to Crankcase Gasket		18202	" "
130		1	Connecting Rod		18215	" "
131		2	Hex Nut - 3/8" - 24 S.A.E.		25X3	" "
132		2	Muffler Mounting Stud		18284	" "
133		1	Engine Piston Pin		18220	" "
134		1	Engine Piston Pin Cotter Pin		10X55	" "
135		1	Engine Piston		18218	" "
136		2	Plain Washer—for 1/4" Bolt		18X70	" "
137		1	By-Pass Valve Plunger Rod Sleeve		18266	" "

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138	18	Lockwasher—for ¼" Bolt	13X18	"	"
139	4	Hex, Nut ¼"—20	27X1	"	"
140	1	Port Plug Screw 5/16"—18 x 5/8"	28x215	"	"
141		By-Pass Valve Plunger Rod Packing	71X11	"	"
142	1	By-Pass Valve Packing Washer	18261	"	"
143	1	By-Pass Valve Bumper Ring	18344	"	"
144	1	By-Pass Valve Plunger Pin	18269	"	"
145	1	By-Pass Valve Plunger	18263	"	"
146	1	By-Pass Valve Body	18566	"	"
147	1	By-Pass Valve Gasket	18264	"	"
148	1	Hammer Piston	17096	"	"
149	1	Hammer Piston Guide	16343	"	"
150	1	Nose Casting	16664	"	"
151	1	Tool Retainer Latch Spring	16348	"	"
152	1	Tool Retainer Latch	18568	"	"
153	1	Tool Retainer	16347	"	"
154	1	Exhaust Muffler	18345	"	"
155	12	Lock Washer—for 3/8" Bolt	13X26	"	"
156	10	Hex, Nut—3/8"—20 S.A.E.	25X4	"	"
157	2	By-Pass Valve Mounting Studs	18210	"	"
158	1	By-Pass Valve Packing Nut	18262	"	"
159	1	By-Pass Valve Return Spring	18267	"	"
160	1	By-Pass Valve Plunger Rod	18265	"	"
161	1	By-Pass Valve Spring Clip	18268	"	"
162	12	Hex, Head Cap Screw ¼"—20x½"	28X40	"	"
163	4	Crank Case Studs	18251	"	"
164	5	Hex, Head Cap Screw 5/16"—18 x ¾"	28X23	"	"
165	2	Brake Shoe Adjusting Screw Washer	18X3	"	"
166	2	Brake Shoe Spring	18227	"	"
167	2	Brake Shoe	18224	"	"

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Ref. No.	S. C. Stock No.	No. Req.	Name & Description	**Function	Mfgr's Part No.	Mfr.
168		2	Brake Shoe Adjusting SCR Lock Nut		25X1	SYNTRON CO.
169		2	Brake Shoe Adjusting Screw		34X13	" "
170		1	Fuel Tank Filler Cap		18579	" "
171		1	Ground Wire Screw Bushing		18229	" "
172		2	Ground Wire Screw Insulating Washer		18230	" "
173		2	Ground Wire Screw Washer		18X37	" "
174		1	Ground Wire Mounting Screw		23X194	" "
175		1	Ground Wire Mounting Screw Nut		19X41	" "
176		2	Lock Washer—for No. 6-32 Screw		13X7	" "
177		2	Stop Button Mounting Screw #6 - 32 x ¼"		23X76	" "
178		1	Stop Button		18228	" "
179		4	Hex, Jam Nut 5/16"—20 S.A.E.		25X21	" "
180		1	By-Pass Valve Control Rod		18553	" "
181		1	Control Rocker Arm		18554	" "
182		1	Handle Tube and Bracket Assembly		18250	" "
183		1	Throttle Control Rod		18551	" "
184		1	Control Lever Push Rod		18552	" "
185		1	Control Lever Mounting Pin		18561	" "
186		4	Plain Washer—¾" O.D. for 5/16" Bolt		18575	" "
187		1	"Operating Instruction" Nameplate		18298	" "
188		4	Drive Screws for Attaching Nameplates		30X1	" "
189		1	"Syntron Gasoline Hammer" Nameplate		18299	" "
190		2	Fuel Tank Housing Support		18315	" "
191		1	Fuel Tank Housing		18330	" "
192		1	Fuel Tank		18095	" "
193		1	Fuel Tank Housing Brace		18309	" "

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194	2	Fuel Tank Webbing	71X48	"	"
195	2	Fuel Tank Mounting Straps	18310	"	"
196	2	Fuel Tank Mounting Bolts ¼"—20 x 2"	28X212	"	"
197	1	Fuel Tank Housing Brace Bolt 5/16"—18 x ½"	28X216	"	"
198	1	Fuel Valve	71X6	"	"
199	1	Throttle Lever Return Spring	18347	"	"
200	1	Throttle Lever	18304	"	"
201	1	Fuel Tube	18300	"	"
202	1	Throttle Lever Clamp Screw—#8—32 x 3/16"	23X89	"	"
203	2	Carburetor Attaching SCR Socket Head	28X211	"	"
204	1	Carburetor to Cylinder Gasket ($\frac{3}{16}$" thickness of gasket)	18256	"	"
205	1	Carburetor Housing	18329	"	"
206	1	Cotter Pin—⅛" x 1" Lg.	10X31	"	"
207	1	Tool Retainer Bolt 5/16"—18 S.A.E. THD	16346	"	"
208	1	Castellated Hex, Nut 5/16"—18 S.A.E.	26X7	"	"
209	2	Tie Rod (Long)	18316	"	"
210	2	Tie Rod (Short)	16352	"	"
211	2	Stator Plate Clamp SCR ¼"—20 x 5/16"	28X122	"	"
212	2	Stator Plate Clamp Washer	18562	"	"
213	2	Brass Hex, Nuts 5/16"—18 U.S.S.	27X59	"	"
214	2	Brass Hex, Nuts 3/8"—16 U.S.S.	27X35	"	"
215	1	Spark Plug Access Hole Cover	18565	"	"
216	1	Rivet 3/16" x ¼" LG	11X106	"	"
217	1	Machine Screw ¼"—20 x ½"	28X217	"	"
218	1	Pressure Test Plug ⅛" STD. Pipe	69X1	"	"
219	2	Plain Washers for 3/16" Bolt	18X10	"	"
220	10	Rivets for Attaching Nameplates	11X145	"	"
221	1	Caution Nameplate	18571	"	"
222	4	Tie Rod Nuts, Bottom 5/16"—14 U. S. S.	27X60	"	"
223	1	Starter Rope Assembly	18583	"	"
224	5	Brake Band Rivets 9/64" x 3/16" Long	71x88	"	"

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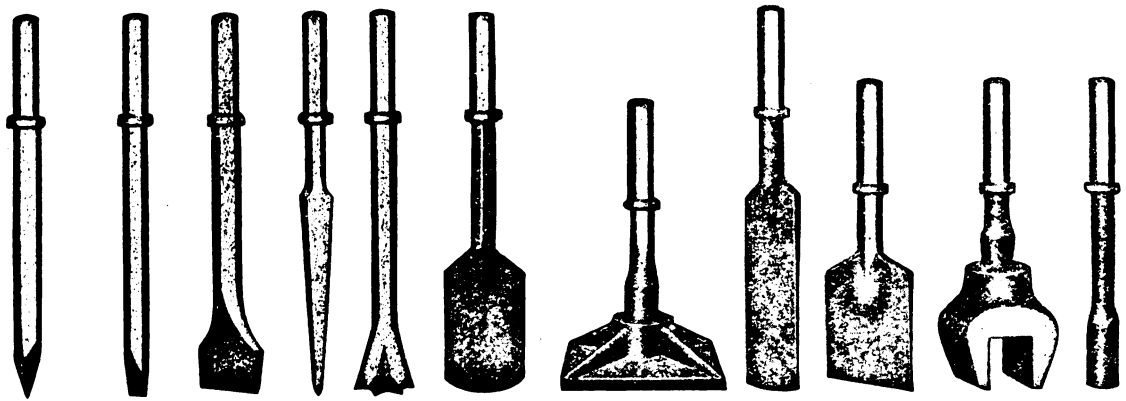
GAS HAMMER TOOLS

All with 1⅛″ x 6″ hex shanks



Tool		Length Under Collar	Weight
Moil Point	#1	14″	6 lb.
" "		18″	7½ "
" "		24″	9 "
" "		30″	11 "
Gads—Narrow Chisel Bits	#2	14″	6 "
" " " "		18″	7½ "
" " " "		24″	9 "
" " " "		30″	11 "
3″ Chisel Bits	#3	14″	7 "
" " "		18″	8 "
2″ x 12″ Frost Wedge	#4	17½″	13 "

Tool		Length Under Collar	Weight
Up to 2″ Solid Drill Steels	#5	18 "	
" " " " "		24 "	
" " " " "		30 "	
" " " " "		36 "	
4½″ x 8½″ Clay Spade	#6	23 "	8½ lb.
5½″ x 8½″ Clay Spade		23 "	9 "
6″ x 6″ Tamping Tool	#7	14½″	14 "
8″ x 8″ Tamping Tool		14½″	21 "
3″ x 12″ Digging Tool	#8	15½″	8½ "
5″ x 6″ Asphalt Cutter	#9	10 "	8 "
2″ Sheathing Driver	#10	10 "	22½ "
3″ Sheathing Driver		10 "	27 "
Ground Rod Driver	#11	14 "	6 "

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